

ACCESSION #: 9204060307
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Oconee Nuclear Station, Unit 3 PAGE: 1 OF 8

DOCKET NUMBER: 05000287

TITLE: Technicians Performing Preventative Maintenance Test On Shutdown
Unit Inappropriately Tested The Wrong Unit Resulting In Unit 3
Reactor Trip

EVENT DATE: 02/27/92 LER #: 92-002-00 REPORT DATE: 03/30/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: S. G. Benesole, Safety Review Group TELEPHONE: (803) 885-3518

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On February 27, 1992, at 1627 hours, Oconee Unit 3 tripped from 100% full power. The unit was operating at steady-state conditions when the reactor tripped from an anticipatory turbine trip. All four Reactor Protective System channels tripped when the Main Turbine tripped on indicated loss of stator cooling. Post-trip response was normal and the Operators stabilized the unit at hot shutdown conditions. Upon investigation of the trip, it was discovered that Instrument and Electrical technicians had inadvertently jumpered a trip circuit on Unit 3 while performing a turbine/generator trip procedure associated with Unit 2 Refueling Outage. The root cause was inappropriate action, failure to adhere to established work practices and policies. Corrective actions included counselling the involved technicians and increased management attention and involvement with correct component identification and independent verification programs.

END OF ABSTRACT

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BACKGROUND

Oconee Nuclear Station has three Babcock & Wilcox units which are almost identical. Except for components located in each unit's Reactor Building, most of the equipment and components are housed in one Turbine Building and one Auxiliary Building. The secondary systems and components housed in the turbine building are arranged with Unit 1 and 2 being a mirror image of one another and Unit 3 similar to Unit 2's arrangement with a slight variation because Unit 1 and 2 have some shared equipment.

The station's component and equipment identification labels are color coded by unit. Unit 1's color scheme is green, Unit 2's is red, and Unit 3's is blue. Since all systems are basically the same, the components and equipment identification numbers are the same for all units except for the unit designation. For instance, valve Auxiliary Steam #34 is labeled "1AS-34" with green background for Unit 1, "2AS-34" with red background for Unit 2, and "3AS-34" with blue background for Unit 3. Shared equipment has no unit designation on the label and uses a black background.

The site utilizes a workforce that is assigned the operation and maintenance for all three units. Most of the workforce is assigned to work on all three units with very little use of unit specific assigned personnel.

EVENT DESCRIPTION

Unit 2 was in the latter stages of a refueling outage and technicians were making the final preparations for unit startup. On February 25, 1992, Instrument and Electrical (I&E) Technicians "A" and "B" and Vendor I&E Technician "C" were assigned IP/0/B/0280/012A - "Turbine and Auxiliaries Turbine-Generator Trips" procedure to perform on Unit 2. This procedure is used to perform Preventive Maintenance on the turbine-generator trip circuits and is scheduled each refueling outage. This is a 52 page procedure that involves a checkout of some 20 different trip circuits and normally takes approximately three working days to complete. I&E Technician "A" was assigned as the lead-person for the three man crew. They completed several portions of the procedure over a two day period with some delays but they were essentially on schedule.

On February 27, 1992, I&E Technician "A" had received approval from

Operations to perform the "Loss of Generator Stator Cooling Trip" portion of the procedure. This simulates the loss of stator cooling by jumpering contacts in the Stator Cooling Panel (SCP) which is located in the turbine building basement (see Attachment 1). I&E Technician "A" would control the test from the Control Room and monitor the alarms to make sure that the proper trips and alarms were received. He had a working copy of the procedure with him which he was using as the controlling document for the task. He discussed the test sequence with I&E Technician "B" and Vendor I&E Technician "C" to ensure that everyone knew what to expect. The plan

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was to have I&E Technician "B" and Vendor I&E Technician "C" go to the SCP and locate the terminals (166 and 167) that would be jumpered to simulate the Loss of Stator Cooling. Once they had located the terminals, they would then contact I&E Technician "A" by two-way radio and tell him they were ready to place the jumper. There was no emphasis in the discussion about being on Unit 2.

With this understanding, I&E Technician "B" and Vendor I&E Technician "C" left the Control Room to locate the Unit 2 SCP. They proceeded to the turbine building basement via a stairway beside the Unit 2 turbine/generator, which they had used several times while performing other sections of this procedure. When they reached the basement, they continued to the Unit 3 SCP which is only a short distance from the stairway. I&E Technician "B" and Vendor I&E Technician "C" had been working prior to this portion of the test on Unit 2 Electro Hydraulic Control (EHC) pumps, which are located only a few feet from the stairway and near the Unit 3 SCP. They had a field copy of the procedure with them. The SCP has three separate compartments, one for each of the following: Stator Coolant Pumps, Seal Oil Pumps and the Hydrogen Panel. I&E Technician "B" momentarily stopped in front of the SCP to identify which compartment contained the terminals. He did this by noting the control switch labels for the Stator Cooling Pumps but failed to note that they were labeled "3A Stator Cooling Pump" and "3B Stator Cooling Pump". Once this was done, he proceeded to the rear of the SCP along with Vendor I&E Technician "C" and opened the rear door to locate terminals 166 and 167. The light inside the compartment did not work, so they replaced it with one from the adjacent compartment so they could clearly read the terminals. Then they proceeded to double-verify the terminals that needed to be jumpered. Once this was performed, they called I&E Technician "A" and told him they were ready to proceed with the test. I&E Technician "A" cleared this with Operations personnel and radioed I&E Technician "B" to place the jumper. I&E Technician "B" told I&E Vendor Technician "C" to place the jumper. As soon as this was done

at 1627 hours, they realized that they were not getting the proper response. They immediately realized they were on the wrong unit, removed the jumper and returned to Unit 2 Control Room. After a discussion concerning the problem, they proceeded to Unit 3 Control Room to inform Operations of their action.

At 16:27:26 hours on February 27, 1992, Unit 3 Reactor tripped from 100% steady-state full power due to anticipatory turbine trip. All four Reactor Protective System channels tripped when the Main Turbine tripped on indicated loss of stator cooling.

Several immediate automatic actions occurred. The Control Rod Drive [EIS:AA] breakers [EIS:BRK] opened, and all control rods dropped into the core, shutting down the reactor. The station auxiliary power [EIS:EA] switched from normal to start-up power and the Main Steam Relief Valves and Turbine Bypass Valves opened. The Operators in the Control Room entered the Emergency Operating Procedure and took manual action to stabilize the unit. They confirmed that the reactor and turbine had tripped, verified

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proper feedwater flow to the Steam Generators and monitored for proper automatic operation of other equipment. They started a second High Pressure Injection (HPI) [EIS:BG] pump at 16:28:30 hours and opened 3HP-26, HPI Loop A Emergency Make-up Valve to increase HPI flow to maintain Pressurizer level. At 16:31:34 hours, the Operators closed 3HP-26 and stopped the second HPI pump. Following these actions, the unit was stabilized at hot shutdown conditions.

Specific post-trip parameters remained within acceptable limits. Reactor Coolant System (RCS) [EIS:AB] pressure ranged between 2204 and 1786 psig. Momentary operation of the second HPI pump enabled the Operators to maintain Pressurizer inventory on scale between a high of 225 inches at the time of the trip and a low of 55 inches. RCS temperature converged smoothly to approximately 555 degrees F. Steam Generator pressure reached a post-trip high of 1102 psig and was controlled by Turbine Bypass Valves at approximately 1010 psig. Steam Generator inventory reduced as normal and controlled at approximately 25 inches. Since the Main Feedwater Pumps remained in operation, there was no actuation of the Emergency Feedwater System [EIS:BA].

There was an immediate investigation as to the cause of the Reactor trip. When the I&E Technicians reported to the Unit 3 Control Room and told of their previous actions, the cause of the trip was apparent. This was confirmed by the unit's event recorder, alarm typer, and transient

monitor. Unit 3 Stator Cooling System was operating normally prior to the trip.

The unit was returned to service. Criticality was achieved at 2335 hours on February 27, 1992 and the turbine/generator placed on line at 0604 hours on February 28, 1992.

CONCLUSIONS

The root cause of this event is inappropriate action, failure to adhere to established work practices and policies. Had Instrument and Electrical (I&E) Technician "B" or Vendor I&E Technician "C" first identified the correct unit prior to placing the jumper and questioned themselves, the reactor trip would have been avoided. They should have performed proper independent verification, instead of one following the lead of the other one to Unit 3's Stator cooling Panel (SCP). Once they were there, they did not identify the unit or even question which unit they were on. This violates established work practices and policies.

Although the inappropriate actions on the part of the I&E Technicians were of a cognitive nature, there were several human factor deficiencies that contributed to the inappropriate actions that may explain why they occurred and also offer ways of prevention for this type of action. These items are discussed as follows:

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1. Procedures are a useful tool in helping the technicians stay focused on the task. The procedure in use for this test is a 52 page procedure which requires the technicians to work on many circuits and components. It utilizes signoffs for correct terminals and components but there are no required signoffs for correct unit or system. This places an emphasis on identifying proper terminals, when in fact the unit and system are just as important. The procedure is a generic procedure for all three units. The terminals all look the same in the SCP and utilize the same numbers for all three units. The only difference is the physical location of the SCPs.
2. The Station color scheme for components and equipment was not useful in preventing this incident because the scheme is not used for the SCPs. The SCPs are not labeled as a major component although there are labels on the various pump switches and controls that identify the unit and name of the equipment; however, they are black labels, thus not color-coded by the unit. The SCPs should be labeled as such and be unit specific.

3. The training program for correct component identification and independent verification was reviewed for adequacy and it was determined that it can be enhanced. It should be noted that these procedures and directives have recently undergone major revisions that will strengthen the work practices. The station personnel are now being trained on the new directives. The training that the I&E technicians had received was based on the previous procedures and directives that did not emphasize identification of the correct unit or stress the color scheme for station labels.

4. The I&E technicians had been working on the Unit 2 electro-hydraulic control pumps, which are located only a short distance from the stairway that they used to get to the basement and which is close to the Unit 3 SCP. They felt secure with their surroundings and overlooked many other Unit 3 labels on equipment that would have alerted them that they may be on the wrong unit. Labels on adjacent equipment or components should be used to help in verifying correct unit/component. They had a mindset that they were on the right component.

5. There was no time pressure to complete the task that was noted from the interviews with the technicians, however, it may have been a factor in that the event occurred within an hour of the end of their shift schedule. They could have been rushing to complete the Loss of Stator Cooling section prior to leaving for the day.

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Although other reactor trips have occurred recently due to inappropriate action(s), none were caused by testing or working on the wrong unit or component; therefore, none of the corrective actions could have addressed this inappropriate action. However, there have been several occurrences involving working on the wrong unit which means the work practice deficiency is a recurring problem. The corrective actions to date from these occurrences have not been effective in reducing the number of events but they have driven the changes to the directives and procedures and these enhancements should start being effective as the technicians are trained on the changes to the program. Management awareness and involvement in the solutions of these problems should help reduce the frequency of these incidents.

There were no personnel injuries, radiation exposures, or significant radioactive releases, nor were there any NPRDS reportable component failures associated with this event.

CORRECTIVE ACTIONS

Immediate

1. Operators took appropriate actions per the Emergency Operating Procedure to bring the unit to stable conditions.

Subsequent

1. The actions of I&E Technician "B" and Vendor I&E Technician "C" have been addressed concerning their inappropriate actions in this event in accordance with Duke Power's corrective discipline policy.

2. The Station Manager met with Instrument and Electrical staff and technicians in a specially called meeting to discuss and emphasize the importance of utilizing the correct techniques in performing component identification and independent verification. The expectation of physically touching the label on the component prior to commencing work was communicated.

Planned

1. All employees that utilize independent verification and/or component identification in their work will receive in-depth training on the revised directive on independent verification/component identification.

2. Operations group will initiate a complete review of the station labeling program described in Station Directive 3.1.6. Work groups that utilize the labeling program will work with Operations to review, redefine and implement the program.

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3. More information will be included in IP/0/B/0280/12A data sheets to aid the I&E Technician in component identification in the performance of this procedure.

SAFETY ANALYSIS

Following the reactor trip, the unit was safely shutdown at a stabilized hot shutdown condition. Emergency Feedwater did not have to activate and the Integrated Control System responded properly. The Operators safely controlled the Unit following the trip. No actuation of Engineered Safeguard Systems [EIS:JE] or Pressurizer Relief Valves occurred, and no

Reactor Coolant System leakage was induced as a result of this trip. There were no reductions in the abilities of the normal plant systems, emergency systems, or Operations personnel to safely control the unit. The trip response did not degrade plant performance and no safety concerns were generated. The health and safety of the public were not affected as a result of this event.

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Figure "Attachment 1" omitted.

ATTACHMENT 1 TO 9204060307 PAGE 1 OF 1

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DUKEPOWER

March 30, 1992

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LER 287/92-02

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 287/92-02, concerning a unit trip.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(iv). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

J. W. Hampton
Vice President

/ftr

Attachment

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